Forest Insect Conditions on the Bridger National Forest 1969

The following is a discussion of various forest insect problems on the Forest during 1969. Material for this report was compiled from aerial survey data and from special on-the-ground biological evaluation surveys.

Briefly, the most important problem is the mountain pine beetle in lodgepole pine. The infestations are increasing in both the eastern (Bridger) and western (Wyoming) Divisions. Logging in and ahead of active infestations in the Wyoming Division will not affect the present situation but will effect long-term control. In the Bridger Division, the infestation remains unchecked and if positive action is not taken in the next two to three years, most of the currently uninfested merchantable lodgepole will be lost. Spruce budworm damage continued for the fifth consecutive year, but well under the 1968 level. Douglas-fir and Engelmann spruce beetle activity continues at a low level. The location of these insect problems are shown on the aerial survey map which was mailed earlier. A more complete discussion of these insect problems follows:

Mountain pine beetle, Dendroctonus ponderosae Hopk.

The mountain pine beetle in lodgepole pine continues as the foremost insect problem on the Forest today. A discussion of this problem by Division follows:

Wyoming Division

A variety of conditions exists in this Division but, for the most part, tree killing and the spread of the beetle is on the increase. The only significant decreases noted during aerial and ground surveys were in the lower reaches of the Greys and Little Greys Rivers and in the upper portions of Middle and South Beaver Creeks on the east side. Places like Aspen Hollow, Dead Dog Creek and Grizzley Basin that supported heavy infestations in the past, have since dropped to a low level. Significant increases in the number of trees killed occur in the upper reaches of the Little Greys River and along the Greys River from Deadman Creek south to South Twin Creek. All of these infestations follow a characteristic pattern: establishment and intensification of the infestation in the lower elevations followed by movement into the higher elevations. In the Greys River proper, there is a slow but significant spread of the infestation upstream, or from north to south. A summary of biological conditions as recorded during a late fall on-the-ground examination of several infested areas follows:

Area	Trees Attacked in 1969 (No.)	1968 (No.)	Buildup 1/ Ratio	Attack 2/ Density	Trend
White Pine Creek	41	16	2.6:1	M	Increasing
So. F. Little Greys	15	48	0.3:1	M	Decreasing
Fork of Rivers	43	39	1.1:1	M	Increasing
White Creek	15	45	0.3:1	L	Decreasing
Deer Cr. G.S.	21	23	0.9:1	M	Static
So. Deadman	83	53	1.6:1	H	Increasing
Lower Deadman	37	15	2.5:1	M	Increasing
Blind Bull	110	64	1.7:1	H	Increasing
Meadows G.S.	114	49	2.3:1	H	Increasing
Forest Park	91	30	3.0:1	H	Increasing

1/ Ratio of new attacks to old, i.e., 41 ÷ 16 = 2.6
2/ L, light; M, moderate; H, heavy.

With only few exceptions, these data portend an increasing trend for most of the important infestation centers on the Division. There is no indication at this time to indicate that natural factors will increase or intervene to offset this increase in tree killing.

The timely and farsighted cutting policy in the Wyoming Division will result in effective long-term control of the beetle. Examples of this are in the "hottest" part of the infestation, between Deadman and Park Creeks, where prompt and orderly removal of infested and susceptible timber not only removed thousands of infested trees, but saved portions of stands that would otherwise have been lost (Figures 1, 2, 3). It is also suspected that there will be far less beetle impact in residual stands.

The situation in Chall (Figure A) and South Beaver Creek on the east slope of the Division was discussed in our September 11, 5230 memorandum. These and other control recommendations will be discussed in the next section.

Bridger Division

The only significant decline in beetle activity in this Division is in the extreme west portion, in Miner and Packer Creeks, on contiguous Bureau of Land Management land on Signal Hill and Kismet Peak, and in several of the older, well established infestations throughout the Division. The remaining and most significant infestations next to the Wilderness boundary are on the increase with no immediate relief in sight.

The most serious infestations remain much the same as last year--from New Fork Lake south to Boulder Lake. Most of the infestations are declining at a lower elevation--because of a lack of suitable host material--and increasing at higher elevations into previous beetle free areas (Figure 6).

A slight increase in tree killing occurred in the southern part of the Division, in the Sweetwater River, and to the north, near Big Sandy opening. Both of these areas will be watched rather closely in 1970, especially Big Sandy where more suitable host material is available. There is little danger of a serious outbreak developing in the Sweetwater area because the dominant type is small, pole size lodgepole.

In order to determine the impact of the mountain pine beetle in certain areas, several cruises were conducted this summer. Timber type, location, age and intensity of infestation, and control opportunities were all factors that were used in the arbitrary selection of these areas. A statistical and graphic presentation of these findings is shown in the appendix and discussed below:

New Fork Lake (Figure 8). This is one of the earlier infestations. At the south end of the lake, the outbreak reached a concernful level around 1965, reached peak tree killing in 1968; and is now on the decline with residual beetle populations killing the smaller trees. This lower area helped provide the impetus for the continuation of the infestation to the east. There the infestation will increase and continue a steady movement into higher elevation stands containing larger, more susceptible trees.

Willow Creek (Figure 9). This infestation is more recent than the New Fork infestation and the stand contains more trees of larger diameter. The current infestation is extremely heavy with an attack density of approximately 20 trees per acre. There are sufficient large diameter lodgepoles in this area to maintain heavy beetle populations for at least two more years. Peak killing will probably occur in 1970. At present, less than 19 percent of the stand is dead with heaviest losses occurring in the large diameter trees. By the time this infestation recedes, most of the merchantable volume will be lost. Conditions in this area also portend subsequent tree losses to the east.

Willow Lake (north) (Figure 10). This stand is an example of many of our "fringe type" stands that appear to suffer the heaviest losses from the mountain pine beetle. Much like the New Fork Lake infestation, the beetle established itself around 1964, probably reached a peak in 1967, one year earlier than in the New Fork Lake area; and has been on the decline since. In this stand, only 52 percent of the lodgepole, 5.1 inch d.b.h. and above, has survived with very little additional mortality expected. Although most of the infestation in this area has "burned itself out," beetle populations have moved into the interior stands to the east where subsequent mortality can be expected.

Willow Lake south) (Figure 11). This area is typical of many of the mixed Douglas-fir lodgepole pine stands on many of the steep north and east-facing slopes in the Division. Because of the obvious scenic values, particularly along many of the larger lakes, these stands are especially important. Although the beetle has killed almost half of the lodgepole pine, the overall stand impact is considerably less because of the mixed type. At this time, there are approximately 3 trees per acre infested with an even lower attack level expected in 1970. Once the infestation completely subsides, only those possessing keen observation will be aware of the damage.

Spring Creek Park (Figure 12). Here is another example of the beetle being nurtured by fringe type lodgepole stands at low elevations and subsequently moving into the uninfested higher areas (Figure 7). In this particular area, the only route left for the infestation is from southwest to northeast. The lower stands are already seriously depleted beyond a merchantable state while the higher stands are now taking the brunt of the infestation. The area northeast of Spring Creek Park probably contains some of the best lodgepole pine in this portion of the Bridger Division. The infestation, however, is now well established with more than 14 percent of the stand killed and a current attack density of 5 trees per acre.

Although somewhat speculative, the infestation should reach a peak level by 1971, at which time most of the larger size classes will have been killed.

A resume of biological conditions in some of these areas and others as recorded during a late fall evaluation survey follows:

Area	Trees Attacked in 1969	1968	Buildup 1/ Ratio	Buildup 2/ Density	Trend
Kelly Park	31	107	0.3:1	M	Decreasing
Spring Creek Park	66	62	1.1:1	H	Increasing

Evaluation survey continued:

Willow Lake (north)	1	60		L	Decreasing
Willow G.S.	98	45	2.2:1	H	Increasing
Little Flattop	115	40	2.9:1	H	Increasing
New Fork Lake #1	46	37	1.2:1	M	Increasing
New Fork Lake #2	11	26	0.4:1	L	Decreasing

These and other data support the general conclusion that the mountain pine beetle situation on the Bridger Division is serious and will remain so for the next three to four years. Most of the older infestations in the lower elevations have declined because of host attrition, but the availability of susceptible size and type to the east continues to nurture the general infestation, intensify tree mortality, and increase its spread.

In the biological evaluations of the past two years, various control alternatives were discussed: (1) chemical treatment of individual trees; (2) chemical treatment integrated with logging; and (3) logging alone. The infestation has now reached a stage, however, where only one of these alternatives is left: logging. Beetle populations are so well established and widespread that individual tree control of any type would be a practice-in-futility. Long-term effective control and efficient utilization of merchantable timber, that will be surely lost to the beetle if nothing is done, can be obtained by logging in and to the east of those infestations still possessing merchantable timber. Upper Boulder Basin, Little and Big Flattop mountain areas, and Spring Creek Park are areas where immediate opportunities now exist. It is likely, for example, that if Spring Creek Park is not logged by late 1971, this final alternative will also be lost.

In the Greys River drainage, of the Wyoming Division, the precedent of logging for long-range control should be continued and possibly increased in an attempt to reach the allowable annual cut. Now that access has improved into the Little Greys, consideration should be given to logging the most heavily infested areas. With the exception of Bull Hollow and possibly some other areas, there is still sufficient merchantable volume in most areas to justify sales.

Removing threatened timber along the Greys River between Buck Creek and South Twin Creek should also be considered. The infestation in Lower Chall Creek and South Beaver Creek, on the east side, poses no immediate threat to the proposed timber sale areas. If the sales are made and logging is completed by fall of 1973, very little, if any, loss will result from the beetle.

Spruce budworm, Choristoneura occidentalis Free.

Active spruce budworm infestations remain in the northern part of the Wyoming Division, in the Greys and Little Greys River drainages, but for the most part feeding damage was considerably less severe than that experienced in 1968. A breakdown of infested acreage by damage classes as recorded during aerial surveys since 1965, the year the infestation began, follows:

	DEFOLIATION INTENSITY			
Year	Light (Acres)	Medium (Acres)	Heavy (Acres)	Total (Acres)
1965	10,000			10,000
1966	33,000	800		33,800
1967	19,500	30,700	1,600	51,800
1968	33,320	53,000	8,860	95,180
1969	69,800	3,000		72,800

What is apparent in the table is the complete absence of heavy defoliation and only 3,000 acres of moderate damage in 1969. The remaining defoliation is classed as light. With only minor changes in infestation boundaries, the overall distribution of the budworm is basically the same as that observed in 1968. Defoliation measurements compared with the predicted, and subsequent defoliation predictions based on a systematic egg mass survey follows:

	1969 Defoliation		1969 Egg Masses		1970
Location	Predicted (Percent)	Actual (Percent)	Per 1000 Sq. In. (Number)	(Percent)	Defoliation (Class)
Black Canyon	90-100	27	5.2	15-25	Light
Bull Hollow	90-100	26	11.7	51-90	Moderate
Porcupine Cr.	90-100	40	12.8	51-90	Moderate
Squaw Cr.	25-50	58	9.7	51-90	Moderate
Bailey Cr.	90-100	18	10.7	51-90	Moderate
Prater Cr.	<15	2	0.0		
Strawberry Cr.	<15	2	0.0		
Higby Cr.	15-25	17	2.8	<15	Light

Location	1969 Defoliation Predicted (Percent)	1969 Defoliation Actual (Percent)	1969 Egg Masses Per 1000 Sq. In. (Number)	1970 Defoliation (Percent)	1970 Defoliation (Class)
Pine Cr.	15-25	--*	0.5	<15	Light
Dry Cr.	<15	7	1.0	<15	Light
Roos Cr.	90-100	32	17.0	90-100	Heavy
Willow Cr.	<15	10	0.6	<15	Light
Blind Bull Cr.	51-90	12	2.7	<15	Light

* No defoliation counts made.

It is apparent from this table that actual defoliation fell short of that predicted in 1968 1/. The low defoliation predictions (<15 percent) were accurate while the higher defoliation classes were consistently over estimated. With only one exception (Squaw Creek), predictions exceeded actual damage. The biological factor(s) responsible for this decline is unknown. In some areas, luxuriant growth helped mask the degree of defoliation, but this does not explain the decrease in larval populations. Similar decreases occurred on the adjacent Targhee, Teton, and Caribou Forests.

This decrease in budworm feeding has permitted many of the most heavily damaged trees to recover and predictions for 1970 indicate an additional year of recovery. At this time, no top kill of consequence or severe damage to the understory has occurred in any part of the infestation. Biological data indicate only light to moderate damage with no significant change in present infestation boundaries for 1970. Control is not recommended.

Douglas-fir beetle, Dendroctonus pseudotsugae Hopk.

Practically all Douglas-fir beetle activity is in the extreme north portion of the Wyoming Division and is more of a nuisance than a serious problem at this time. Tree killing of relatively large groups, many of which are visible from the highway, continues near the top of the north slope of the Grand Canyon of the Snake River. Practically all of the infestation centers are inaccessible; and even if they were not, the impact on the water and travel influence zones would preclude logging

1/ Forest Insect Conditions on the Bridger National Forest, 1968, 9pp. typed.

as a control or salvage measure. Continued and possibly increased tree killing can be expected in this area in 1970.

Engelmann spruce beetle, Dendroctonus obesus Mann.

Engelmann spruce beetle activity, which reached a relatively high level in 1968, showed a major decline in 1969. Most of the infestations were in high elevation, roadless, spruce stands in the northern half of the Wyoming Division. Unknown natural factors of apparent effectiveness significantly reduced tree killing in all but a few locations. Small patches of widely scattered tree killing still continues, but at a reduced level, in the upper portions of North Horse Creek, South Fork of North Horse Creek, North Fork Dry Beaver Creek, and in Dry Beaver Creek. One patch of some 30 trees was detected in North Three Fork Creek. None of these areas were visited on the ground; consequently, their future status is unknown.

The current situation in standing and windthrown trees in the Horse Creek Sale Area was discussed in our August 27, 5240 memorandum. Briefly, it was recommended that burning the slash and windthrown material before flight next spring would minimize subsequent hazard to the residual stand.

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Entomologist

APPENDIX

Figure 1. Stereograph of view looking north down Greys River in the Wyoming Division. Park Creek in foreground with recent clearcuts between Park and Buck Creeks. Note buildup of infested trees. This area is near the south boundary of the present infestation. Bear Creek coming in on left. Kodacolor-X

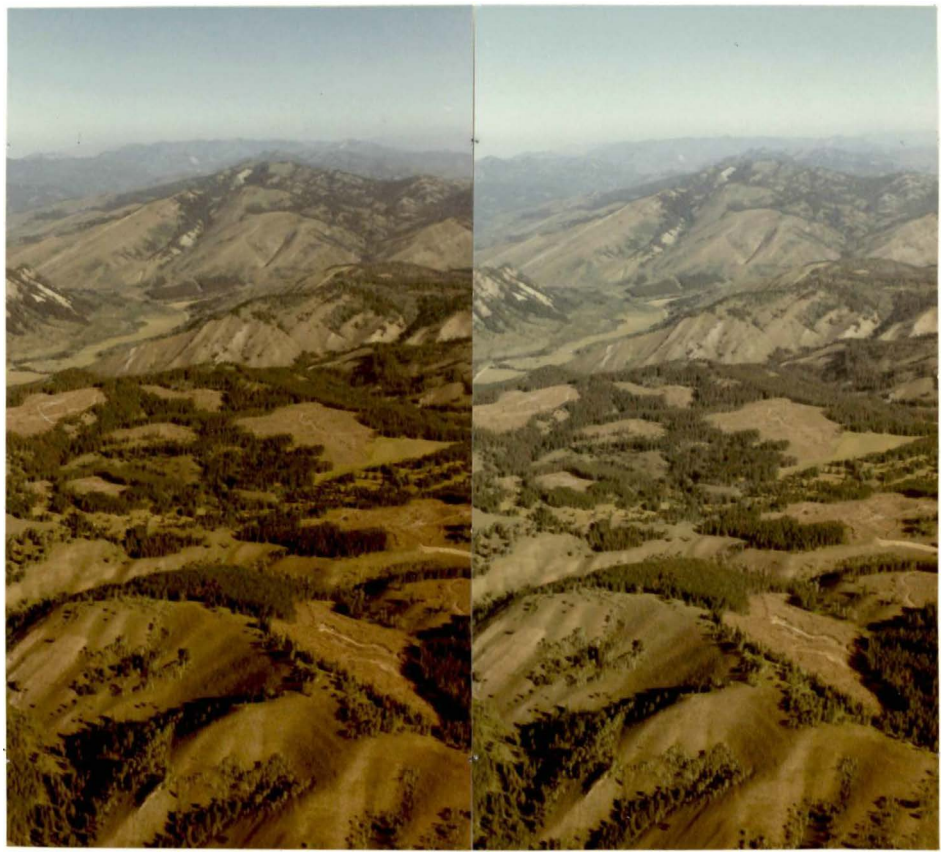


Figure 2. Stereograph showing recent clearcuts in heart of infestation between Trail and Deadman Creeks in Wyoming Division. Note infested trees in residual stand and the orderly disposition of slash in the clearcuts. Greys River in upper left. Kodacolor-X

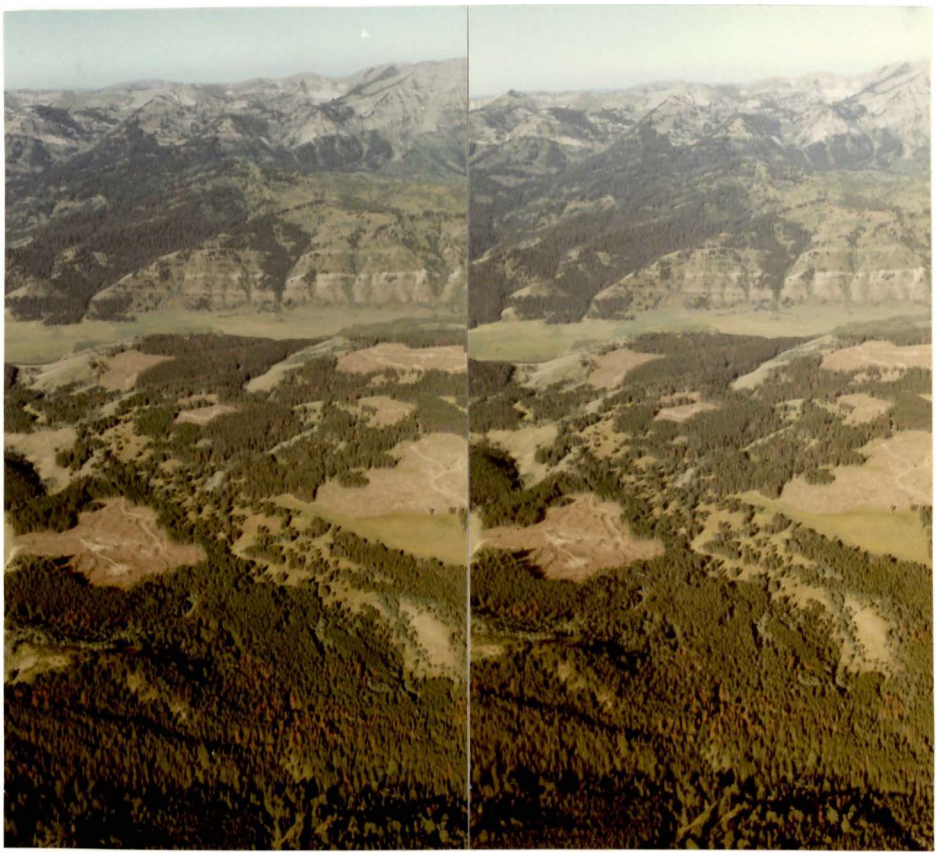


Figure 3. Stereograph of same area shown in Figure 2, but looking west. Note infestation level. Greys River in background. Kodacolor-X

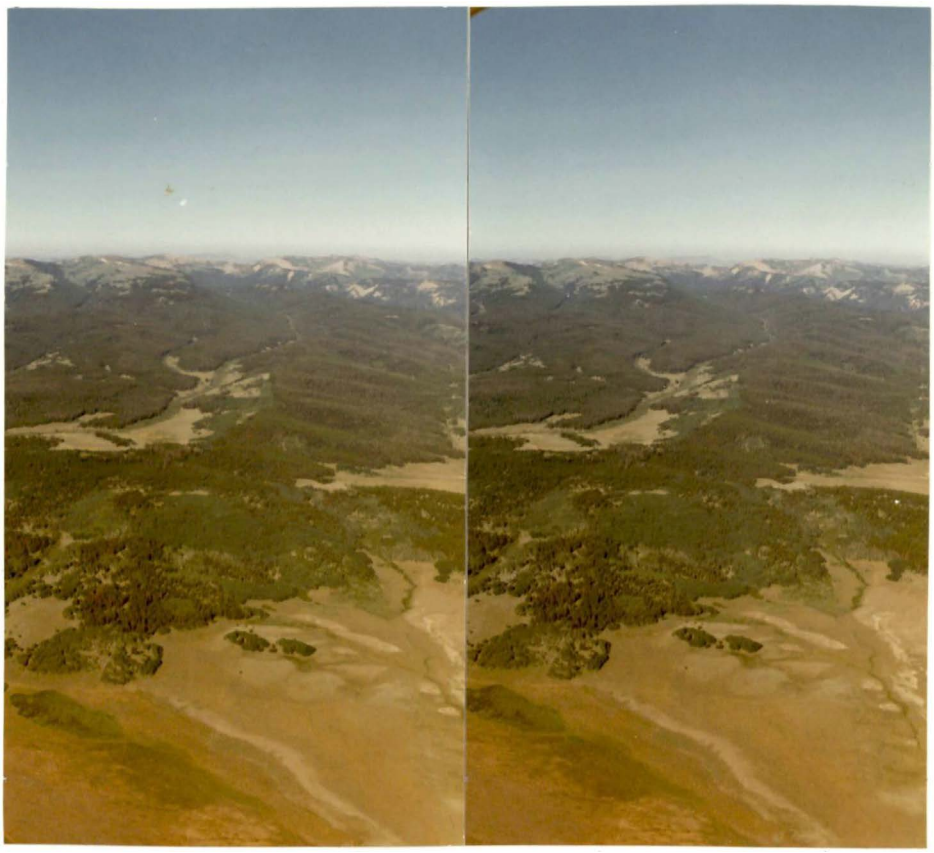


Figure 4. Stereograph of view looking west into Chall Creek or the east slope of the Wyoming Division. The preponderance of snags are subalpine fir and lodgepole pine killed by past beetle outbreaks. Proposed sales will convert these decadent stands to a youthful, vigorous and manageable state. South Fork of Hoback River on Teton Forest in background. Kodacolor-X

Figure 5. Stereograph of view of clearcuts in upper Middle Beaver Creek. Chall Creek (Figure 4) is to immediate left (south). Under good management, the mountain pine beetle will be less of a factor in the future. Upper Hoback River on the Teton Forest in background. Kodacolor-X

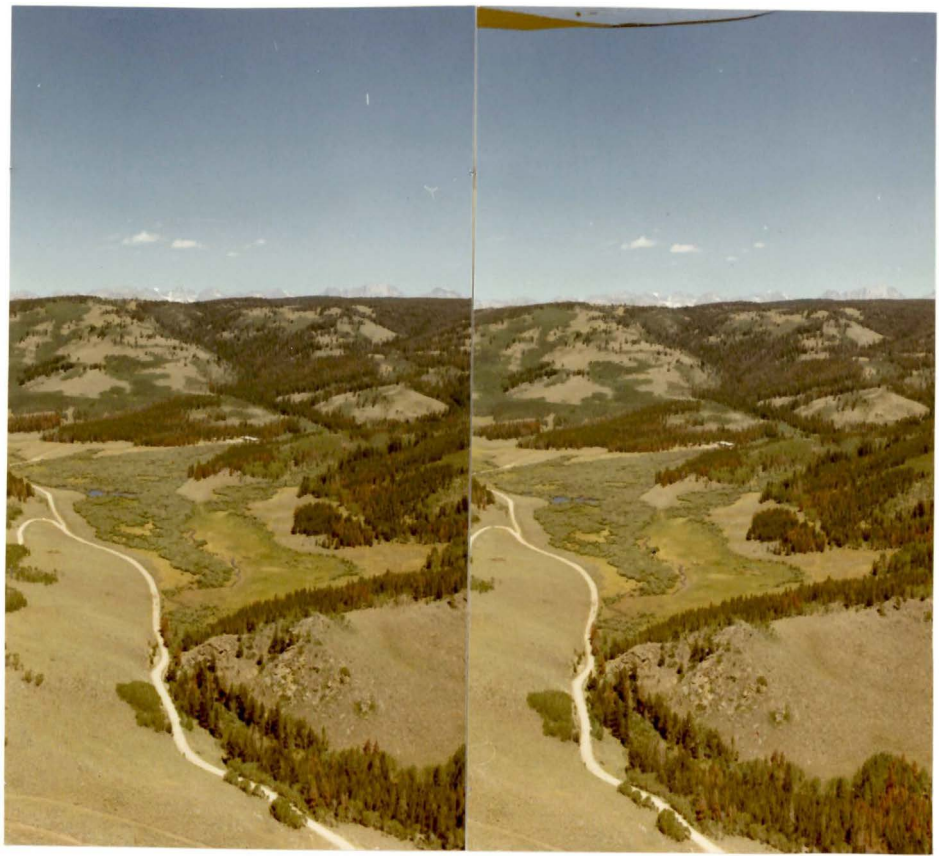


Figure 6. Stereograph of view looking east in central portion of Bridger Division (Faler Ranch). These fringe type stands intensify the infestation which is now moving to the east into beetle free areas. Bridger Wilderness and Continental Divide in background. Kodacolor-X

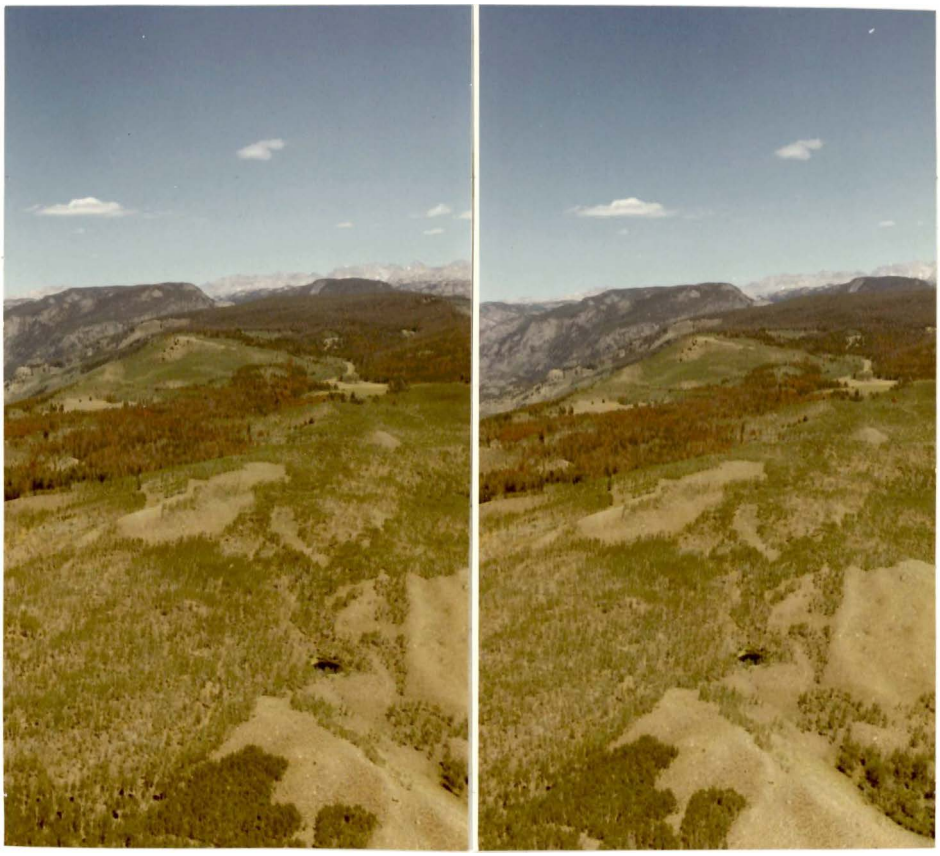
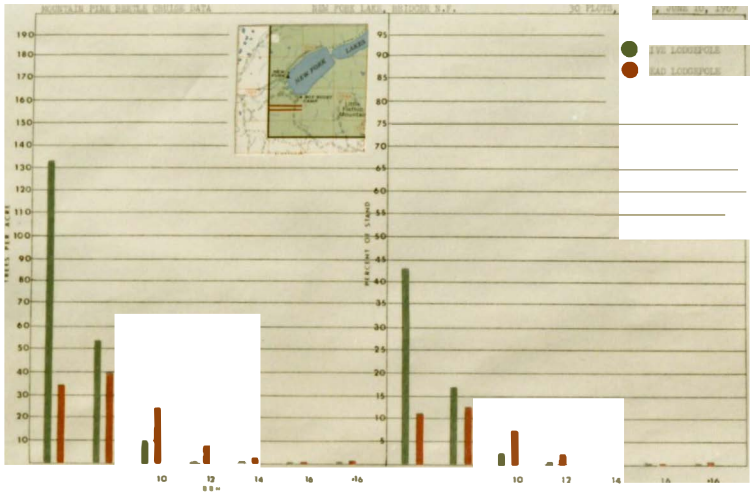


Figure 7. Stereograph of view looking northeast into Spring Creek Park in the Bridger Division. The fringe type stand in the foreground, which is now greatly depleted, nurtured the infestation which is now moving to the northeast. If the timber in the background is not cut by fall of 1971, most of the larger trees will be killed by the mountain pine beetle. Bridger Wilderness and Continental Divide in background. Kodacolor-X

Figure 8. Graphic and statistical presentation of stand structure in several areas on the Bridger National Forest, 1969.

Area	Diameter Class (In.)	Trees Per Acre							
		Live Lpp. (No.)	(%)[1]	Dead Lpp. (No.)	(%)[1]	Live Other[2] (No.)	(%)[1]	Total All Spp. (No.)	(%)
New Fork Lake	6	132.6	43.2	34.0	11.1	0.0	0.0	166.6	54.3
	8	53.0	17.3	39.0	12.7	0.0	0.0	92.0	30.0
Basal Area/Acre(Ft.^{2})	10	9.0	2.9	24.6	8.0	0.0	0.0	33.6	10.9
Live Lpp. 51.3	12	0.8	0.3	8.0	2.6	0.0	0.0	8.8	2.9
Dead Lpp. 45.6									
Other Spp.[2] 0.0	14	0.9	0.3	2.7	0.9	0.0	0.0	3.6	1.2
Total 96.9	16	0.2	0.1	0.4	0.1	0.0	0.0	0.6	0.2
SE%[3] 6.9	>16	0.4	0.1	1.2	0.4	0.0	0.0	1.6	0.5
Total		196.9	64.2	109.9	35.8	0.0	0.0	306.8	100.0

1/ Percent of total stand.
None
3/ One standard deviation.



:gure 9. Graphic and statistical presentation of stand structure in several areas on the Bridger National Forest, 1969.

Area	Diameter Class (In.)	Trees Per Acre: Live Lpp. (No.)	(%)[1]	Dead Lpp. (No.)	(%)[1]	Live Other[2] (No.)	(%)[1]	All Spp. (No.)	(%)
Willow Creek	6	82.0	32.2	7.5	2.9	2.5	1.0	92.5	36.1
	8	63.0	24.6	7.0	2.7	0.0	0.0	70.0	27.3
Basal Area/Acre (Ft.^{2})	10	34.2	13.3	9.9	3.9	0.0	0.0	44.1	17.2
Live Lpp. 80.0	12	18.6	7.3	15.6	6.1	0.6	0.2	34.8	13.6
Dead Lpp. 32.0									
Other Spp.[2] 1.0	14	6.5	2.5	5.5	2.1	0.0	0.0	12.0	4.6
Total 113.0	16	0.0	0.0	2.0	0.8	0.0	0.0	2.0	0.8
SE%[3] 9.6	>16	0.0	0.0	0.9	0.4	0.0	0.0	0.9	0.4
Total		204.8	79.9	48.4	18.9	3.1	1.2	256.3	100.0

1/ Percent of total stand.
2/ Limber pine.
3/ One standard deviation.

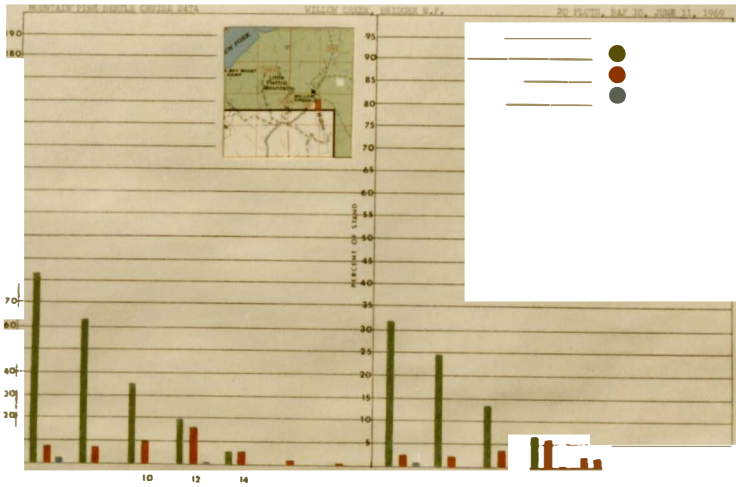
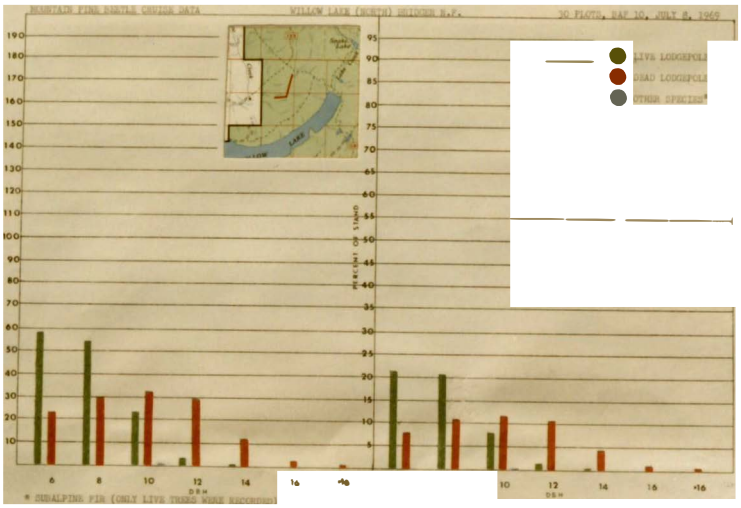


Figure 10. Graphic and statistical presentation of stand structure in several areas on the Bridger National Forest, 1969.

Area	Diameter Class (In.)	Trees Per Acre							
		Live Lpp. (No.)	(%)[1]	Dead Lpp. (No.)	(%)[1]	Live Other[2] (No.)	(%)[1]	Total All Spp. (No.)	(%)
Willow Lake (North)	6	57.8	21.7	22.1	8.3	0.0	0.0	79.9	30.0
		54.0	20.3	29.0	10.9	0.0	0.0	83.0	31.2
Basal Area/Acre (Ft.^{2})	10	22.2	8.3	31.8	11.9	0.6	0.2	54.6	20.4
Live Lpp. 45.6	12	3.6	1.4	28.8	10.8	0.0	0.0	32.4	12.2
Dead Lpp. 75.0									
Other Spp.[2] 0.3	14	0.9	0.3	11.7	4.4	0.0	0.0	12.6	4.7
Total 120.9	16	0.0	0.0	2.8	1.1	0.0	0.0	2.8	1.1
SE% [3] 7.7	>16	0.0	0.0	1.0	0.4	0.0	0.0	1.0	0.4
Total		138.5	52.0	127.2	47.8	0.6	0.2	266.3	100.0

1/ Percent of total stand.
2/ Subalpine fir.
3/ One standard deviation.



igure 11. Graphic and statistical presentation of stand structure in several areas on the Bridger National Forest, 1969.

Area	Diameter Class (In.)	Trees Per Acre: Live Lpp. (No.)	(%)[1]	Dead Lpp. (No.)	(%)[1]	Live Other[2] (No.)	(%)[1]	Total All Spp. (No.)	(%)
Willow Lake (South)	6	35.0	11.9	20.0	6.8	55.0	18.7	110.0	37.4
	8	19.6	6.6	14.0	4.8	36.4	12.4	70.0	23.8
Basal Area/Acre (Ft.^{2})	10	8.1	2.8	13.5	4.6	34.2	11.6	55.8	19.0
Live Lpp. 23.5	12	5.4	1.8	6.0	2.0	20.4	6.9	31.8	10.7
Dead Lpp. 24.0									
Other Spp.[2] 92.5	14	0.5	0.2	0.5	0.2	8.0	2.7	9.0	3.1
Total 140.0	16	0.0	0.0	1.2	0.4	6.8	2.3	8.0	2.7
SE% [3] 4.9	>16	0.0	0.0	0.3	0.1	9.6	3.2	9.9	3.3
Total		68.6	23.3	55.5	18.9	170.4	57.8	294.5	100.0

[1] Percent of total stand.
[2] Douglas-fir
[3] One standard deviation.

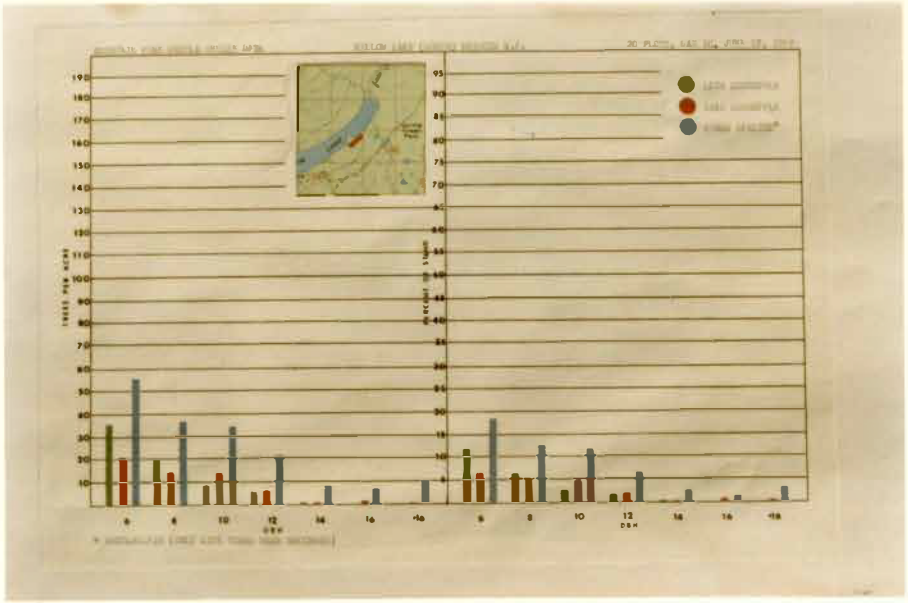


Figure 12. Graphic and statistical presentation of stand structure in several areas on the Bridger National Forest, 1969.

Area		Diameter Class (In.)	Trees Per Acre							
			Live Lpp. (No.)	(%)[1]	Dead Lpp. (No.)	(%)[1]	Live Other[2] (No.)	(%)[1]	Total All Spp. (No.)	(%)
Spring Creek Park		6	20.4	9.1	0.0	0.0	13.6	6.1	40.0	15.2
		8	28.0	12.5	11.0	4.9	12.0	5.3	51.0	22.7
Basal Area/Acre (Ft.^{2})		10	31.8	14.2	3.6	1.6	6.0	2.7	41.4	18.5
Live Lpp.	109.3	12	33.2	14.8	5.6	2.5	3.2	1.4	42.0	18.7
Dead Lpp.	28.3									
Other Spp.[2]	21.3	14	21.9	9.7	4.2	1.9	3.3	1.5	29.4	13.1
Total	158.9	16	8.2	3.6	1.6	0.7	1.2	0.5	11.0	4.8
SE% [3] 7.5		>16	7.6	3.4	6.2	2.8	1.8	0.8	15.6	7.0
Total			151.1	67.3	32.2	14.4	41.1	18.3	224.4	100.0

[1] Percent of total stand.
[2] Subalpine fir, Engelmann spruce, limber pine.
[3] One standard deviation.